CHERP Policy Brief

VOLUME III, ISSUE 1: FALL 2005

U.S. Obesity, Weight Gain, and Socioeconomic Status

Virginia W. Chang, MD, PhD
CHERP Investigator
Assistant Professor
Department of Medicine, University of Pennsylvania School of Medicine and Department of Sociology, University of Pennsylvania

Income and income inequality are not the entire answer to the challenge of weight gain and rising levels of obesity in the U.S.

Context: People in the U.S. are getting fatter. Unhealthy weight is no longer an individual issue, but a national problem. According to the Centers for Disease Control and the National Institutes of Health, overweight and obesity and their associated health problems carry direct and indirect costs approaching those of cigarette smoking. The root causes for the national weight gain are complex and poorly understood; however, researchers are looking to race, socioeconomics, geography, and other factors in their attempts to understand why the U.S. is becoming so fat.

Background

Recent efforts to understand the rising levels of overweight and obesity have focused on income as a factor. However, while one can document links between socioeconomic position and health measures such as mortality, the relationship between socioeconomic status and intermediate health endpoints, such as weight, are not well established.

While there are many measures of socioeconomic status, income and income inequality have been shown to affect certain aspects of health. Income provides information about resources available to individuals. Income inequality–the amount of income difference in a given area–provides information about the differences in resources among area residents. Greater income inequality is thought to be detrimental to the health of community members.

In two recent research projects, CHERP investigator Virginia Chang, MD, PhD and colleagues examined the roles that income and income inequality play in overweight and obesity in the U.S.

Income and Weight Over Time

Data

- Chang and colleagues used four successive waves of the National Health and Nutrition Examination Survey (NHANES) to examine the relationship between income and body mass index (BMI) and income and obesity among U.S. adults from 1971-2002. The researchers used survey waves NHANES I (1971-1974), II (1976-1980), III (1988-1994), and continuous (1999-2002). The study included non-pregnant non-Hispanic white, non-Hispanic black, and Mexican American adults aged 18-64. All data were analyzed separately by race and sex, revealing important differences among the groups.

CHERP
CENTER FOR HEALTH EQUITY RESEARCH AND PROMOTION

VA HSR&D CENTER OF EXCELLENCE

www.cherp.org

- The NHANES data provide a snapshot of U.S. citizens' health at successive points in time and are obtained through in-person interviews and physical examinations. Body mass index is a measure of weight (in kilograms) over height (in meters) squared. BMIs increase with obesity and overweight.

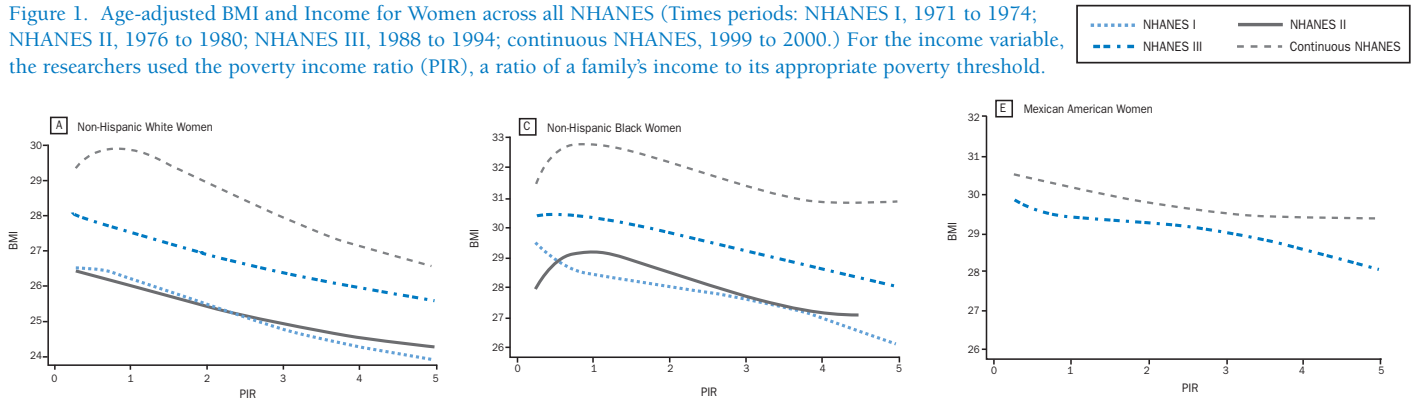
Results

Obesity prevalence and average BMI increased at all levels of income during the past three decades, but some income groups had larger and faster increases in obesity than others.

- Consistent with other research, Chang and colleagues found that mean BMI and the prevalence of obesity increased significantly among all of the race-sex groups over the three decades included in the data set. While the numbers held steady during the 1970s, the largest increases occurred over 1988-2002.

- Income and BMI were related, but the nature of this relationship changed over time and depended on race and sex. As shown in the figures below, white women demonstrated a consistent inverse association between income and BMI. Black women appeared to have a less consistent inverse association between income and BMI. For Mexican American women, the relationship was similar, but weaker.

Figure 1. Age-adjusted BMI and Income for Women across all NHANES (Times periods: NHANES I, 1971 to 1974; NHANES II, 1976 to 1980; NHANES III, 1988 to 1994; continuous NHANES, 1999 to 2000.) For the income variable, the researchers used the poverty income ratio (PIR), a ratio of a family's income to its appropriate poverty threshold.



- Increases in the prevalence of obesity varied by income group. From 1971 to 2002, among middle-income black women, the rate of obesity increased 27%, while among poor black women it rose only 14.5%. Among white women, the picture is different. The wealthiest showed only a 13% increase in the prevalence of obesity while the poorest had an increase of 22.6%. In contrast, among Mexican American women there were no significant changes in the obesity rates at any level of income.

Despite weight gain, higher income white and black women retained their health advantage.

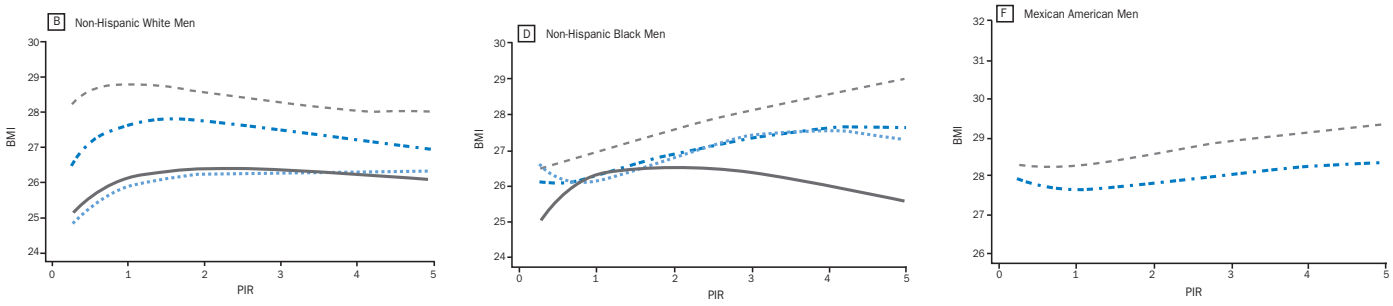
- The wealthiest women of today have a higher frequency of obesity than low-income women in the 1970s; however, in every NHANES wave, wealthier women had lower rates of obesity than lower-income women from the same period. Therefore, despite rising rates of obesity and increasing BMIs among white and black women at all incomes, those at higher incomes sustained a distinct health advantage in weight status.

In contrast to white men and in contrast to all groups of women, black and Mexican American men showed a positive relationship between income and weight.

- Among black men at the highest income level, obesity prevalence increased 21% across the period of this study. At every other income level the rise was less than 7%. Indeed, this increase among the wealthy led to the recent emergence of an unexpected positive association between income and weight status for black men, where weight increases as income rises. Among Mexican American men, those identified as upper-middle income showed the largest increase in obesity, and these men also exhibited a positive relationship between income and obesity prevalence in the most recent survey. For white men the picture is quite different, with the poorest showing the highest increase in obesity prevalence (22.6%).

- Graphs of BMI against income reveal a slight inverse association among white men and a changing relationship between BMI and income among black men, with an increasingly positive association emerging. The graphs also demonstrate a modest positive relationship between BMI and income among Mexican American men.

Figure 2. Age-adjusted BMI and Income for Men across all NHANES (Times periods: NHANES I, 1971 to 1974; NHANES II, 1976 to 1980; NHANES III, 1988 to 1994; continuous NHANES, 1999 to 2000.) For the income variable, the researchers used the poverty income ratio (PIR), a ratio of a family's income to its appropriate poverty threshold.



Income Inequality and Weight Data

- Chang and colleagues assessed income inequality using data from the 1990 U.S. Census. For the geographic area measure, they used metropolitan statistical areas (MSAs), which are urban areas that have at least one city with a population of 50,000 or more and are comprised of adjacent communities that share similar economic and social characteristics. Individual health variables were drawn from the Behavioral Risk Factor Surveillance System (BRFSS) for the years 1996-1998. These data were then divided into 4 race-sex groups: non-Hispanic black men and women and non-Hispanic white men and women. The overall sample size was 143,931 (68,545 white women, 56,263 white men, 12,200 black women, and 6,923 black men).

Results

Area income inequality was linked with lower weight among white women. Among black men, black women, and white men, income inequality did not have a significant relationship with weight.

- The researchers found that for non-Hispanic white women, living in an MSA with greater income inequality was associated with lower BMI, lower odds for being overweight, and lower odds for being obese. It was also associated with greater odds of trying to lose weight. The researchers found no significant effect of area income inequality for white men, or black men and women. The direction of the relationship, however, was often negative, similar to what was found among white women.

Implications

- Earlier work has assumed a relatively simple relationship between income and obesity whereby obesity and overweight were both thought to be more common and increasing the most rapidly among the poor. Research by Chang and colleagues reveals that these relationships are far more complex. Increases in the prevalence of obesity are neither limited to nor typically highest among the poor. The differences in the relationship between weight and income, or income gradients, suggests that weight disparities are only partially attributable to poverty. Indeed, racial/ethnic discrepancies in weight status persist at broadly equivalent levels of income, suggesting that the differences among races are not solely due to income. Interventions designed to reduce the prevalence of obesity and high BMI will have to take these complexities into account in their design. Successful interventions will be targeted to the populations they are designed to serve.

- In contrast to previous work reporting that area-level income inequality has an adverse effect on outcomes such as mortality and general health status, the researchers found no evidence for a health-impairing effect on weight status. If it is the case that inequality is associated with higher mortality and lower overall health status, then unhealthy weights likely do not play an intermediary role.

- Efforts to find the causes of the rise in obesity and mean BMI in the U.S. mirror, to some extent, current research to understand the causes of a number of health disparities, particularly in regard to the role of socioeconomic factors. In both areas of study, it is assumed that the poor are always worse off and that income inequality leads to worse outcomes. This research demonstrates that such truisms may not be true all of the time.

This issue of the CHERP Policy Brief is based on the following publications: Chang VW, Lauderdale DS. Income Disparities in Body Mass Index and Obesity in the United States,1971-2002. Arch Intern Med. 2005 Oct 10;165(18):2122-2128 and Chang VW, Christakis NA. Income inequality and weight status in U.S. metropolitan areas. Soc Sci Med. 2005 Jul;61(1):83-96. Epub 2005 Jan 11. The following websites provided background information: http://win.niddk.nih.gov/statistics/#econ and http://www.cdc.gov/nccdphp/dnpa/obesity/economic_consequences.htm

Published by the Center for Health Equity Research and Promotion (CHERP), a VA HSR&D Center of Excellence. Christine Weeks, Editor. Michael J. Fine, MD, MSc, Director. David A. Asch, MD, MBA, Co-Director. The mission of CHERP is to reduce disparities in health and health care among veterans and other populations.

Policy Briefs contextualize and analyze the research publications of CHERP investigators. CHERP is a cooperative center consisting of faculty from the VA Pittsburgh Healthcare System, Philadelphia VA Medical Center, the University of Pittsburgh, and the University of Pennsylvania School of Medicine. For more information visit www.cherp.org or contact the editor via email: christine.weeks@med.va.gov.

CHERP
Center for Health Equity Research and Promotion
VA Medical Center, 9 East
3900 Woodland Avenue
Philadelphia, PA 19104-4155